serious study of one of these branches might be begun.

Necessarily the accounts given are summary, and perhaps dogmatism is also necessary, but some of the matter included might give way to at least a brief statement of the other side of the case. The enunciation of the James-Lange theory of emotion at the present day without reference to any opposition except a footnote controverting deductions from Sherrington's dog is somewhat misleading.

A similar lack of proportion in what is intended to be a text-book is noticeable throughout. Undue prominence is given to observations and theories in which the author is specially interested, but which are by no means universally accepted. As a single example, three pages are devoted to the enumeration of many specific tendencies and actions as separate instincts, some of which it would be very difficult to bring within any modern definition of instinct known to the present writer. On the other hand, there is no reference to McDougall's grouping of such actions under a limited number of heads as instincts with associated emotions. The usefulness of the latter concept is sufficiently widely recognised to deserve mention.

Dr. Stoddart, in his adherence to the doctrine of Freud, shows all the devoutness of the convert. He accepts the literal truth of the whole gospel, including such generalisations as that dreams are invariably distorted wish fulfilments, and that neuroses and psychoses are without exception the results of repression of sexual impulses.

Surely the battle dreams of the war neuroses have rendered the former statement untenable except by the exercise of the most perverse ingenuity. As to the second, the employment of the usual evasion that Freud and his followers use the term "sexual" in a much wider sense than is usual renders discussion meaningless. The sexual instinct is not a phenomenal reality, but a concept; the extent to which it is useful to group observed phenomena of conduct under the term is a question, not of fact, but of opinion. However, in practice Dr. Stoddart, like other extreme exponents, refers all abnormalities of thought and conduct to the crudest anomalies of this instinct in its narrowest sense.

The reviewer accepts most of Freud's description of the manner in which thinking is distorted by "complexes" in the normal and the neuropath, in dreams and similar states. But he failed to repress a smile on comparing two statements in this book, first, that in psycho-analysis suggestion is most scrupulously avoided, and secondly, that with sufferers from anxiety neurosis, terrified by an air raid, the most superficial analysis—presumably to elicit the meaning of the terror—revealed the phallic significance in their minds of Zeppelins, aeroplanes, and bombs! It is the ill-concealed satisfaction of the psycho-analyst with this type of association that evokes them.

The description of the clinical forms of the neuroses and psychoses is excellent apart from a few examples of the disproportion and excessive dogmatism referred to. But with the author's change of views it requires more careful revision to render it consistent.

ASPECTS OF MODERN SCIENCE.

The Realities of Modern Science: An Introduction for the General Reader. By John Mills. Pp. xi + 327. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1919.) Price 10*s.* 6*d.* net.

Modern Science and Materialism. By Hugh Elliot. Pp. vii + 211. (London: Longmans, Green, and Co., 1919.) Price 7*s.* 6*d.* net.

(1) THE first of these works is evidently that of an enthusiastic scientific student, rather than teacher, who has found the systems of school and college instruction in physical science prevailing in America unsatisfactory. He desires, commendably enough, to see them replaced by courses based fundamentally upon the modern conceptions which have been arrived at only within the last two or three generations, not only for the few specialist, but also for general, students. This praiseworthy motive is, however, not likely to be much furthered by the book under notice. The author would have done better to write a book for science teachers and to assume throughout a knowledge equal to that obtainable from the despised college courses. As it is, it is difficult to understand for whom exactly the book is intended. In the first half the reader is assumed to be the veriest tyro in science, and there is much gilding of the philosophic pill. The beginnings of knowledge, of machinery, and of experimentation, weights and measures, the molecular theory, the "realities of science," electrons, the nucleus and energy are discussed rather desultorily. Then follow three chapters on the most obvious and elementary algebra, to which the non-mathematical reader is advised to give only cursory and mechanical reading in order to reach the second part of the book.

Then the author lets himself go. The reader is absolutely forgotten, or at least he must have had, in an interim, the advantage of several years of serious study of science sufficient to enable him to understand, if not to profit by, the particular parts of the last half-century's advances in physics,

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physical chemistry, and chemistry which the author reconstructs in terms of the present day. The kinetic theory of gases, the conduction of electricity through gases, liquids, and solids, the phenomena of electromagnetism, the van der Waals equation, solutions, electrolytic dissociation, chemical equilibria and their displacement, le Chatelier's theorem, Brownian movement, electronic and molecular magnitudes, with something about X-rays and radio-active substances, are the subjects which the tyro, who may not be able to comprehend an algebraic relation, is asked to assimilate in the remaining 150 pages. The aid of the merely verbal acquaintance he has made with the few ultimate conceptions of physics is not likely to fit him for the task. For these conceptions—matter, energy, radiation, the electron, the nucleus, the quantum, and so on —are the end-products of scientific philosophy, not the starting points, and cannot replace, at all events yet, the body of experimental and actual scientific knowledge out of which they have grown. It is true that they may be the "realities of modern science," but a universe reconstructed out of them *ab initio* without other guide would bear as little resemblance to reality as that created by the end-products of mythological and religious philosophy.

(2) This work is of a totally different character, and though it represents the same desire to synthesise and bring within the comprehension of the individual a vast range—in fact, in this case, the whole—of knowledge by means of a few generalised conceptions, it is written and intended for the serious student and mature thinker. The author upholds the extremest doctrines of materialistic philosophy. To him there is no real distinction between an engine and an engine-driver. In such philosophical discussions it is well to remember the mathematical adage that what is got out in the proof is no more and no less than what was put in at the enunciation. The first two chapters, on the (inanimate) universe and on matter and energy, give an excellent account of scientific materialism, as now universally accepted for the inanimate world. The rest of the book, on life and consciousness, on the fallacy of vitalism, and on materialism and idealism, seeks to extend this doctrine of the inanimate universe to the animate, with results as outrageous to common sense surely as any philosophical system ever devised.

The main, if not the only, issue of scientific interest, the difference between a complex organic compound and a living organism, or, for that matter, between the same organism alive and dead, is ignored. Living protoplasm is just a complex organic compound, so very complex that it nourishes itself by internal secretion, reproduces itself, and, gradually, throughout geological time modifies itself in constitution, so that, originally an amœba, it finishes as a man. To the chemist, who may be supposed to know something at least about chemical compounds, if not to the biologist, the view that living protoplasm is no more than a very complex compound is fantastic.

Laplace's doctrine of rigid determinism, applied to this monism of the animate and inanimate, leads the author to deduce that what he is now writing and the sentiments his words will convey to his readers could have been known and predicted a myriad years ago by a being of infinite knowledge and mathematical power from a study of the distribution of matter and energy in the original nebula. Events of great consequence to the future are frequently decided by men on the spin of a coin. Leave out the inanimate world and whether from his nebula the omniscient being could predict the fall of the coin, though the modern mathematical physicist would probably give reasons for an answer to this question totally different from Laplace's view. Leave out the question of moral judgments, and how they originate, altogether. Here is a man on the point of calling "Heads or Tails?" to decide the course of the future—but with the decision still untaken—with a certain distribution of energy and matter in his brain. We are asked to believe that this matter and energy will be differently distributed in a manner obvious to an omniscient being—that one distribution will make him call "Tails" and another "Heads." A scientific materialism that calmly accepts positive answers to such unsolved problems as these concerning free-will and the nature of life is scientific surely only in name.

F. SODDY.

OUR BOOKSHELF.

Mathematical Papers for Admission into the Royal Military Academy and the Royal Military College and Papers in Elementary Engineering for Naval Cadetships for the Years 1909–18. Edited by R. M. Milne. (London: Macmillan and Co., Ltd., 1919.) Price 7*s*.

A RECENT issue of this collection of examination papers has been reviewed in NATURE. It remains only to say that the papers added in the new issue maintain the standard of excellence already noticed. The questions are remarkably suitable for the discovery of what the candidates know.

Mesures Pratiques en Radioactivité. By Dr. W. Makower and Dr. H. Geiger. Traduit de l'Anglais by E. Philippi. Pp. vii+181. (Paris: Gauthier-Villars et Cie, 1919.) Price 8 francs.

A GOOD French translation of this well-known and admirable work.

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